Hayley Owens

Ph.D. Candidate, Computer Science — Tufts University

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Research Interests

Personalization and adaptation in human-robot interaction; policy learning and generalization via data augmentation; group dynamics modeling; human-robot group interaction and dynamics; equivariant representations for imitation learning.

Education

Tufts University *2022 – Present*
Ph.D., Computer Science *(expected 2027)*
M.S., Computer Science *(2024)*
Advisor: Elaine Short
Organizations: ACM-W

Louisiana Tech University *2018 – 2022*
B.S., Computer Science — *Summa Cum Laude*, GPA: 3.97
Minors: Mathematics, Cloud Computing & Big Data
Organizations: ACM, Upsilon Pi Epsilon, College of Engineering & Science Ambassador

Publications

Owens, H., Aronson, R. M., & Short, E. (2024).
The Limits of Robot Moderators: Evidence Against Robot Personalization and Participation Equalization in a Building Task.
IEEE International Conference on Robot and Human Interactive Communication (RO-MAN), Pasadena.

Gizzi, E., **Owens, H.**, et al. (2025).
OnAIR: Applications of The NASA On-Board Artificial Intelligence Research Platform.
AAAI Innovative Applications of Artificial Intelligence (IAAI), Philadelphia.

Gizzi, E., **Owens, H.**, Pellegrino, N., Trombley, C., Marshall, J., & Sinapov, J. (2022).
Autonomous System-Level Fault Diagnosis in Satellites Using Housekeeping Telemetry.
Small Satellite Conference (SmallSat).

Current Research

Understand Perceptions of Equivariant Polcies
Understanding the use of geometric equivariance and how a user perceives policy behavior and trajectory motions. Future work to be done in muli-policy combination and similarity scoring using geometrically expanded policy representations in latent space.

Automated Group Dynamics Modeling
Building an automated pipeline using LLMs for transcript processing and behavioral data coding. Constructing graph-based representations of group dynamics from engineered behavioral features to model inequity real-time in engineering design teams.

Research & Industry Experience

AI Research Intern — Swarms *Jun–Aug 2024*
NASA Goddard Space Flight Center

- Led a team of interns developing intelligent swarm manipulation systems
- Proposed and evaluated a novel contrastive learning loss function for out-of-distribution detection, outperforming existing baselines
- Prototyped novelty detection on soil imagery for potential atypical terrain identification
- Built a multi-drone communication and coordination framework using REDIS and peer-to-peer sharing

DTRA Chem-Bio Threat Reduction Intern *Jun–Aug 2022*
Pacific Northwest National Laboratory (PNNL)

- Built an AI-driven web application for bio-chemical threat reduction under DTRA sponsorship
- Applied novel methods including paired neural networks, autoencoders, k-NN probability estimation, and random forests in low/imbalanced data settings
- Won 1st place in the 9th Annual Chem-Bio Defense Application Development Competition

AI Research Intern (RAISR Project) *Jun–Aug 2021*
NASA Goddard Space Flight Center (via USRA)

- Developed a reinforcement learning (PPO) anomaly detection model achieving 98.1% accuracy on spacecraft telemetry with explainable outputs
- Built an ensemble fault-diagnosis algorithm for satellite systems to attribute causes to out-of-boundary faults
- Contributed to the open-source OnAIR platform for onboard spacecraft AI reasoning

Mobile App Development Intern *Aug 2019–Jan 2021*
PioneerRx

- Developed cross-platform mobile apps in C# and Xamarin, including a timeclock module with offline clock-in support
- Built a Python SVM script for automated classification of git commit messages and release notes
- Worked in an Agile development environment with a professional engineering team

Coding Instructor *Apr–Aug 2019*
Code Ninjas

- Taught programming and STEM concepts to children using Roblox, Minecraft, Scratch, JavaScript, and Lua
- Designed an original RPGMaker curriculum covering software basics and JavaScript plugin development

Selected Projects

HearRing github.com/HayleyO/Senior-Design
Smartwatch accessibility application for Deaf and hard-of-hearing users. Integrated real-time sound classification, context-aware haptic feedback with adjustable intensity ranges, speech-to-text, and text-to-speech on a paired mobile app.

OnAIR — Open-Source Spacecraft AI Platform
Contributed to NASA's open-source platform for onboard AI reasoning on spacecraft, supporting fault detection and autonomous decision-making.

Teaching & Outreach

Teaching Assistant, Tufts University
Human-Computer Interaction, Human-Robot Interaction, Robot Teaching Lab

MassRobotics — Robot Block Party
Ran public demonstrations and explained current lab research to the community.

Tufts Girl Scout Robotics Workshop
Volunteered at a daylong robotics workshop for local Girl Scout troops.
engineering.tufts.edu/news-events/news/robotics-event-inspires-future-engineers

Lowell Boy Scouts Guest Speaker
Presented on robotics applications in space exploration to a local troop.

Honors & Awards

Adams Fellowship — Tufts University graduate award for interdisciplinary research

1st Place, Chem-Bio Defense Application Competition — DTRA/PNNL, 2022

Shoot the Moon Award — Freshman cyber exhibition, awarded for an ambitious project

CREWE Certificate of Completion — Google-sponsored Cyber Research Experience for Women Experimenters

President's Honors List — Louisiana Tech University

Summa Cum Laude — Louisiana Tech University, GPA: 3.97

Skills

Languages: Python, C++, Java, C#

ML / AI: PyTorch, Reinforcement Learning (PPO, A2C), Imitation Learning, Behavior Cloning, Contrastive Learning

Systems / Tools: ROS, OpenCV, Linux, Git

Simulation: Robosuite, MuJoCo, Genesis

Methods: Multimodal data collection, data augmentation, user studies

Coursework: Human-Robot Interaction, Reinforcement Learning, Probabilistic Robotics, Intro to Machine Learning, AI, HCI, Computational Cognitive Science, Goal & Plan Recognition